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(54) **ELECTRONIC EXPANSION VALVE, STOPPING STRUCTURE THEREOF, AND REFRIGERATION DEVICE**

ELEKTRONISCHES EXPANSIONSVENTIL UND ANSCHLAGSTRUKTUR DAFÜR SOWIE KÜHLGERÄT

SOUPAPE D’EXPANSION ÉLECTRONIQUE, STRUCTURE D’ARRÊT ASSOCIÉE ET DISPOSITIF DE RÉFRIGÉRATION

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of solenoid valves, and in particular, to an electronic expansion valve and a stop structure thereof, and a refrigeration device.

BACKGROUND

[0002] In the related art, the stop structure of the electronic expansion valve usually includes a nut with an internal thread, and a spring guide rail and a slip ring that are both sleeved on the nut. The lower end of the spring guide rail has a first stop extending in the axial direction, and the lower end of the first stop is clamped with a metal connecting piece provided in the middle of the connection seat at the lower end of the nut. However, when the slip ring moves along the spring guide rail, it will have a certain impact on the spring guide rail, and it is easy to loosen the spring guide rail after a long time. CN105333197 relates to an electric valve stop device including a spring guide rail and a slip ring which are nested inside and outside and are screwed together.

[0003] CN106246983B discloses a stop structure for an electronic expansion valve according to the preamble of claim 1.

SUMMARY

[0004] A stop structure according to the invention is defined in independent claim 1. Further preferred embodiments are defined in the dependent claims.

[0005] In the present disclosure, the limiting snap protrusion is provided at one end of the pipe body close to the connection seat for installing the first stop of the spring guide rail, such that the first stop does not need to extend to the metal connecting piece on the connection seat for fixing, and the axial extension length of the first stop can be shortened, which can improve the impact resistance of the first stop, so that the first stop is not easy to be displaced or deformed. Therefore, the loosening of the spring guide rail can be prevented, and the coaxiality of the guide portion of the spring guide rail and the pipe body can be ensured, thereby improving the reliability of the stop structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIG 1 is a schematic structural view of an electronic expansion valve according to an embodiment of the present invention.

FIG 2 is a schematic structural view of a stop structure of an electronic expansion valve not according to the invention from a perspective.

FIG. 3 is an exploded schematic view of the stop structure in FIG. 2.

FIG. 4 is a side view of the stop structure in FIG. 2.

FIG 5 is a sectional view of the stop structure in FIG 2.

FIG 6 is a schematic structural view of the stop structure in FIG 2 from another perspective.

FIG 7 is a schematic structural view of a nut in FIG 2.

FIG 8 is a schematic structural view of a spring guide rail in FIG 2.

FIG 9 is a schematic structural view of a slip ring in FIG. 2.

FIG 10 is a schematic structural view of the spring guide rail of the electronic expansion valve according according to the present invention.

FIG 11 is a schematic structural view of the nut of the electronic expansion valve according to another embodiment of the present disclosure.

Description of reference signs

[0007]

reference sign	name	reference sign	name
100	stop structure	223	second axial segment
10	nut	224	second circumferential segment

(continued)

reference sign	name	reference sign	name
11	pipe body	23	second stop
111	limiting snap protrusion	30	slip ring
112	blocking protrusion	a1	first avoidance interval
12	connection seat	a2	second avoidance interval
13	extension portion	a3	third avoidance interval
20	spring guide rail	1000	electronic expansion valve
21	guide portion	200	valve casing
22	first stop	210	casing
221	first axial segment	220	valve seat
222	first circumferential segment	300	metal connecting piece

[0008] The realization of the objective, functional characteristics, and advantages of the present disclosure are further described with reference to the accompanying drawings.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0009] It should be noted that if there is a directional indication (such as up, down, left, right, front, rear...) in the embodiments of the present disclosure, the directional indication is only used to explain the relative positional relationship, movement, etc. of the components in a certain posture (as shown in the drawings). If the specific posture changes, the directional indication will change accordingly.

[0010] In addition, the descriptions associated with, e.g., "first" and "second," in the present disclosure are merely for descriptive purposes, and cannot be understood as indicating or suggesting relative importance or impliedly indicating the number of the indicated technical feature, Therefore, the feature associated with "first" or "second" can expressly or impliedly include at least one such feature.

[0011] Besides, the meaning of "and/or" appearing in the disclosure includes three parallel scenarios. For example, "A and/or B" includes only A, or only B, or both A and B.

[0012] The present invention provides a stop structure with a nut, and an electronic expansion valve with the stop structure. As shown in FIGS. 1-6 and 9, the electronic expansion valve 1000 includes a stop structure 100, the stop structure 100 includes a nut 10, a spring guide rail 20 and a slip ring 30, and the spring guide rail 20 and the slip ring 30 are screwed together and then sleeved on the nut 10.

[0013] In an embodiment not according to the invention, as shown in FIG 1 to FIG 7, the nut 10 includes a pipe body 11 and a connection seat 12. An outer peripheral wall of a first end of the pipe body 11 is protruded with a limiting snap protrusion 111. The connection seat 12 is connected to the first end of the pipe body 11, and a first avoidance interval a1 is provided between the limiting snap protrusion 111 and the connection seat 12 for installing a first stop 22 of the spring guide rail 20.

[0014] In the state shown in FIG 2 and FIG 7, the connection seat 12 is provided at the lower end (i.e., the first end) of the pipe body 11, and the limiting snap protrusion 111 is provided at the lower end of the outer peripheral wall of the pipe body 11.

[0015] Without loss of generality, the pipe body 11 has an internal thread, and the outer diameter or equivalent outer diameter of the connection seat 12 is larger than the outer diameter or equivalent outer diameter of the pipe body 11. A stepped structure is formed between the connection seat 12 and the pipe body 11. The inner diameter or equivalent inner diameter of the connection seat 12 is larger than the inner diameter or equivalent inner diameter of the pipe body 11.

[0016] In addition, it should be noted that, in order to facilitate the description of the present disclosure, the following will assist in the detailed description of the stop structure 100 in the state shown in FIG 2 and FIG 7, but this is not intended to limit the present disclosure.

[0017] As shown in FIGS. 1 to 6 and 8, the spring guide rail 20 includes a guide portion 21 sleeved outside the pipe body 11, and a first stop 22 provided at one end of the guide portion 21. The first stop 22 includes a first axial segment 221 connected to the guide portion 21, and a first circumferential segment 222 connected to a tail end of the first axial segment 221. The first axial segment 221 extends along a length direction of the nut 10 (toward a direction away from the second end of the pipe body 11). The first circumferential segment 222 extends along the circumferential direction of the nut 10. The first axial segment 221 is located on one side of the limiting snap protrusion 111, and the first circumferential segment 222 is located in the first avoidance interval a1 and abuts on the side surface of the limiting snap protrusion 111 away from the second end of the pipe body. That is, the first circumferential segment 222 hooks on the limiting snap protrusion 111 to limit the sliding of the spring guide rail 20 in the direction close to the second end of the pipe body 11.

[0018] In the state shown in FIG 2, the first axial segment 221 is located on the right of the limiting snap protrusion 111 and abuts against the right of the limiting snap protrusion 111 to enhance the compactness of the structure.

[0019] Specifically, the slip ring 30 and the guide portion 21 are nested and screwed to each other, and the slip ring 30 can slide along the guide portion 21 in the length direction of the nut 10.

[0020] Specifically, one end of the guide portion 21 toward the connection seat 12 is spaced from the connection seat 12 along the length direction of the nut 10.

[0021] It can be understood that the first axial segment 221 is located on the downward stroke of the slip ring 30 (the downward movement of the slip ring 30 means that the slip ring 30 slides toward the first end of the pipe body 11). When the slip ring 30 goes down, the end of the slip ring 30 toward the connection seat 12 can abut against the first axial segment 221, so as to limit the down movement of the slip ring 30 and realize the down stop. One end of the slip ring 30 toward the connection seat 12 abuts against (is used to abut against) the side of the first axial segment 221 away from the limiting snap protrusion 111. It should be pointed out that, if the first axial segment 221 abuts on the right side surface of the limiting snap protrusion 111, the impact of the impact force of the slip ring 30 on the first stop 22 can be further reduced.

[0022] According to the invention, the limiting snap protrusion 111 is provided at one end of the pipe body 11 close to the connection seat 12 for installing the first stop 22 of the spring guide rail 20, such that the first stop 22 does not need to extend to the metal connecting piece 300 on the connection seat 12 for fixing, and the axial extension length of the first stop 22 can be shortened, which can improve the impact resistance of the first stop 22, so that the first stop is not easy to be displaced or deformed. Therefore, the loosening of the spring guide rail 20 can be prevented, and the coaxiality of the guide portion of the spring guide rail 20 and the pipe body 11 can be ensured, thereby improving the reliability of the stop structure 100.

[0023] In a specific application, the limiting snap protrusion 111 can be set in a relatively regular shape such as a circle, a rectangle, or a trapezoid, or can be set in an irregular shape, as long as it can cooperate with the first stop 22. Setting it to a relatively regular shape such as a circle, a rectangle, or a trapezoid can facilitate design and production. The following description will mainly take the setting of the limiting snap protrusion 111 as a rectangle as an example for description. It should be noted that, the above shape refers to the projected shape of the limiting snap protrusion 111 on the peripheral surface of the pipe body 11.

[0024] Further, as shown in FIG 7, one end of the connection seat 12 connected to the pipe body 11 is provided with an extension portion 13 extending toward the pipe body 11, the extension portion 13 is staggered from the limiting snap protrusion 111, a second avoidance interval a2 and a third avoidance interval a3 are respectively formed on both sides of a circumferential direction of the limiting snap protrusion 111, and the first avoidance interval a1 is integrated with the second avoidance interval a2 and the third avoidance interval a3 to form a U-shaped limiting groove for limiting the first stop 22.

[0025] As shown in FIG 2 and FIG 4 to FIG 6, the first circumferential segment 222 is adapted to be arranged within the first avoidance interval a1. In this way, the first circumferential segment 222 can be limited within the first avoidance interval a1, so as to realize the axial limit of the spring guide rail 20.

[0026] Specifically, as shown in FIG 2 and FIG 6, the first axial segment 221 is adapted to be arranged in the second avoidance interval a2 or the third avoidance interval a3, so that the first axial segment 221 can be limited, thereby realizing the circumferential limitation of the spring guide rail 20.

[0027] In this way, through the above structure arrangement, the circumferential and axial positions of the spring guide rail 20 can be achieved, and the impact resistance of the first stop 22 can be further improved, thereby improving the installation stability of the spring guide rail 20.

[0028] During assembly, the first stop 22 only needs to be opened by an external force, so that the first circumferential segment 222 passes over the limiting snap protrusion 111, and then resets under the elastic force of the first stop 22 itself. The first circumferential segment 222 is snapped into the first avoidance interval a1, and the first axial segment 221 is snapped into the second avoidance interval a2 or the third avoidance interval a3.

[0029] Further, as shown in FIG 7, the limiting snap protrusion 111 protrudes from the extension portion 13 in the direction toward the second end of the pipe body 11. In this way, when the slip ring 30 goes down, the abutment between the lower end of the slip ring 30 and the first axial segment 221 corresponds to the portion of the limiting snap protrusion 111 protruding from the extension portion 13, so that the impact on the first axial segment 221 can be reduced.

[0030] Specifically, the outer peripheral surface of the extension portion 13 is configured as a cone torus surface or an arc torus surface. In one embodiment, the outer peripheral surface of the end of the connection seat 12 connected to the pipe body 11 is set as a cone torus surface or an arc torus surface.

[0031] Further, as shown in FIG 2, the side surface of the limiting snap protrusion 111 toward the second end of the pipe body 11 is close to the start end of the first axial section 221 in the length direction of the nut 10. That is to say, the side surface of the limiting snap protrusion 111 toward the second end of the pipe body 11 is disposed close to the start end of the first axial segment 221 in the length direction of the nut 10. In this way, the length of the first axial segment 221 can be shortened, and the structure compactness and impact resistance can be improved.

[0032] Further, at least a part of the peripheral surface of the limiting snap protrusion 111 is inclined in a direction away from the second end of the pipe body 11 and in a direction away from the centerline of the pipe body 11. In other words, the thickness of the limiting snap protrusion 111 is at least partially increased in the direction away from the second end of the pipe body 11. In this way, when the spring guide rail 20 is installed, the first circumferential segment 222 can be guided to slide in a direction away from the second end of the pipe body 11, thereby reducing the difficulty of assembly.

[0033] Further, as shown in FIGS. 1-6 and 8, the first stop 22 further includes a second axial segment 223 connected to the end of the first circumferential segment 222. The second axial segment 223 extends in a direction close to the second end of the pipe body 11 and is located on the other side of the limiting snap protrusion 111.

[0034] Specifically, one of the first axial segment 221 and the second axial segment 223 is fitted within the second avoidance interval a2, and the other is fitted within the third avoidance interval a3.

[0035] In this way, the connection stability and reliability of the first stop22 can be further improved, so as to further reduce the risk of loosening.

[0036] Further, the ratio of the length of the second axial segment 223 to the width of the limiting snap protrusion 111 in the length direction of the nut 10 is greater than or equal to 1/4. In this way, the second axial segment 223 can be guaranteed to have a certain impact capacity.

[0037] In the present embodiment, as shown in FIGS. 1-6 and 8, the length of the second axial segment 223 is equivalent to the width of the limiting snap protrusion 111 in the length direction of the nut 10.

[0038] According to the invention, as shown in FIG 10, in order to further improve the connection stability of the first stop 22, the first stop 22 further includes a second circumferential segment 224 connected to the end of the second axial segment 223. The second circumferential section 224 extends along the circumferential direction of the nut 10. The second circumferential section 224 is located on the side of the limiting snap protrusion 111 toward the second end of the pipe body 11. The end of the second circumferential segment 224 is connected to the first axial segment 221 and/or the guide portion 21. In this way, the structural strength of the first stop 22 can be improved, so as to further improve the installation stability and impact resistance of the first stop 22.

[0039] It should be noted that in other embodiments, the connection stability of the first stop 22 can also be improved by other forms. For example, in some embodiments, a limiting groove can be provided on the side surface of the limiting snap protrusion 111 away from the second end of the pipe body 11, and the first circumferential segment 222 is snapped into the limiting groove. In another embodiment, the free end (that is, the end away from the center line of the pipe body 11) of the limiting snap protrusion 111 is provided with a limiting protrusion protruding in the direction away from the second end of the pipe body 11. A clamping groove is formed between the limiting protrusion and the outer peripheral wall of the pipe body 11, and the first circumferential segment 222 is clamped in the clamping groove. In some another embodiments, the side surface of the limiting snap protrusion 111 away from the second end of the pipe body 11 is inclined in the circumferential direction of the nut 10. The first circumferential segment 222 is inclined in a direction away from the first axial section 221 and is inclined in a direction close to the second end of the pipe body 11. The first circumferential segment 222 is adapted to abut against the side surface of the limiting snap protrusion 111 away from the second end of the pipe body 11.

[0040] It should be pointed out that, in specific applications, the above structural forms for improving the connection stability of the first stop 22 can be used alone or in combination with each other without being contradictory.

[0041] It should be noted that, in other embodiments, the circumferential limit may also be formed on the first stop 22 and the spring guide rail 20 in other ways.

[0042] In another embodiment of the present invention, as shown in FIG. 11, the outer peripheral wall of the first end of the pipe body 11 is further provided with a blocking protrusion 112. The blocking protrusions 112 and the limiting snap protrusions 111 are spaced apart in the circumferential direction of the nut 10. The first axial segment 221 is clamped between the limiting snap protrusion 111 and the blocking protrusion 112, so as to limit the first stop 22 and the spring guide rail 20 in the circumferential direction. The slip ring 30 can abut against the other side of the blocking protrusion 112 or abut against the first axial segment 221 when it descends.

[0043] In this embodiment, the other limitations of the limiting snap protrusion 111 and the first stop 22 can be referred to the above embodiments, and it is unnecessary to repeat them here.

[0044] In another embodiment not according to the invention, the first stop 22 at least includes a first axial segment 221, a first circumferential segment 222 and a second axial segment 223, so as to be respectively disposed on at least three sides of the limiting snap protrusion 111 to realize circumferential limiting of the first stop 22 and the spring guide rail 20. In addition, the slip ring 30 can abut against the first axial segment 221 when it descends. In this embodiment, it is not necessary to provide the extension portion 13 and the blocking portion.

[0045] According to the invention, the first stop 22 includes a first axial segment 221, a first circumferential segment 222, a second axial segment 223 and a second circumferential segment 224, which are respectively disposed on four sides of the limiting snap protrusion 111.

[0046] In this embodiment, the other limitations of the limiting snap protrusion 111 and the first stop 22 can be referred to the above embodiments, and it is unnecessary to repeat them here.

[0047] Other structures of the electronic expansion valve 1000 are briefly described below.

[0048] Further, as shown in FIG 1, the electronic expansion valve 1000 further includes a valve casing 200, the valve casing 200 includes a casing 210 and a valve seat 220, and the stop structure 100 is installed in the valve casing 200.

[0049] Specifically, the outer peripheral surface of the connection seat 12 is provided with a metal connecting piece 300, and the metal connecting piece 300 is connected to the valve seat 220. In one embodiment, the metal connecting piece 300 and the connection seat 12 are integrally injection-molded.

[0050] Further, as shown in FIG 1 to FIG 7, the spring guide rail 20 further includes a second stop 23. The slip ring 30 slides between the second stop 23 and the first stop 22 along the guide portion 21.

[0051] Specifically, the spring guide 20 generally adopts a cylindrical spring.

[0052] It can be understood that in the present disclosure, the stop structure 100 of the electronic expansion valve 1000 has a simple and compact structure, is easy to install, and can reduce the production cost of the electronic expansion valve.

[0053] The present disclosure also proposes a refrigeration device, the refrigeration device includes an electronic expansion valve, and the specific structure of the electronic expansion valve refers to the above-mentioned embodiment. Since the refrigeration device of the present disclosure adopts all the technical solutions of the above-mentioned embodiments, it has at least all the beneficial effects brought by the technical solutions of the above-mentioned embodiments, and will not be repeated here.

[0054] In an embodiment, the refrigeration device is an air conditioner, a refrigerator, or the like.

Claims

1. A stop structure (100) for an electronic expansion valve (1000), wherein the stop structure (100) comprises:

    a nut (10) comprising a pipe body (11) comprising a first end and a second end, an outer peripheral wall of the first end of the pipe body (11) being protruded with a limiting snap protrusion (111); and a connection seat (12) connected to the first end of the pipe body (11), a first avoidance interval (a1) being provided between the limiting snap protrusion (111) and the connection seat (12) for installing a first stop (22) of the spring guide rail (20); and

    a spring guide rail (20),

    wherein the spring guide rail (20) comprises a guide portion (21) sleeved on the pipe body (11), and a first stop (22) provided at one end of the guide portion (21), wherein the first stop (22) comprises a first axial segment (221) connected to the guide portion (21), and a first circumferential segment (222) connected to a tail end of the first axial segment (221), wherein the first axial segment (221) extends along a length direction of the nut (10), wherein the first circumferential segment (222) extends along the circumferential direction of the nut (10), wherein the first axial segment (221) is located on one side of the limiting snap protrusion (111), and wherein the first circumferential segment (222) is located in the first avoidance interval (a1) and abuts on a side surface of the limiting snap protrusion (111) away from a second end of the pipe body (11), wherein the first stop (22) further comprises a second axial segment (223) connected to a tail end of the first circumferential segment (222), and wherein the second axial segment (223) extends towards the second end of the pipe body (11), and is located on another side of the limiting snap protrusion (111),

    characterized in that the first stop (22) further comprises a second circumferential segment (224) connected to a tail end of the second axial segment (223), the second circumferential segment (224) extending along the circumferential direction of the nut (10), wherein the second circumferential segment (224) is located on a side of the limiting snap protrusion (111) toward the second end of the pipe body (11), and wherein a tail end of the second circumferential segment (224) is connected to the first axial segment (221) and/or the guide portion (21).

2. The stop structure (100) of claim 1, wherein the nut (10) further comprises: one end of the connection seat (12) connected to the pipe body (11) being provided with an extension portion (13) extending toward the pipe body (11), wherein the extension portion (13) is staggered from the limiting snap protrusion (111), wherein a second avoidance interval (a2) and a third avoidance interval (a3) are respectively distributed on two sides of a circumferential direction of the limiting snap protrusion (111), and wherein the first avoidance interval (a1) is integrated with the second

avoidance interval (a2) and the third avoidance interval (a3) to form a U-shaped limiting groove for limiting the first stop (22).

3. The stop structure (100) of claim 2, wherein the nut (10) further comprises the limiting snap protrusion (111) protruding out of the extension portion (13) in a direction toward the second end of the pipe body (11).

4. The stop structure (100) of claim 1, wherein the nut (10) further comprises the outer peripheral wall of the first end of the pipe body (11) being further provided with a blocking protrusion (112), and wherein the blocking protrusion (112) and the limiting snap protrusion (111) are spaced apart in a circumferential direction of the nut (10), to limit the first stop (22) in the circumferential direction.

5. The stop structure (100) of any one of claims 1 to 4, wherein the nut (10) further comprises at least a part of a peripheral surface of the limiting snap protrusion (111) being inclined in a direction away from the second end of the pipe body (11) and in a direction away from a centerline of the pipe body (11).

6. The stop structure (100) of any one of claims 1 to 4, wherein the nut (10) further comprises:

a limiting groove being provided on a side face of the limiting snap protrusion (111) away from the second end of the pipe body (11); or
an end of the limiting snap protrusion (111) away from the pipe body (11) being provided with a limiting protrusion protruding in a direction away from a second end of the pipe body (11), to form a slot between the limiting protrusion and the outer peripheral wall of the pipe body (11); or
a side surface of the limiting snap protrusion (111) away from the second end of the pipe body (11) being inclined in a circumferential direction of the nut (10).

7. The stop structure (100) of any preceding claim, wherein a side surface of the limiting snap protrusion (111) toward the second end of the pipe body (11) abuts a start end of the first axial segment (221) along the length direction of the nut (10).

8. An electronic expansion valve (1000) comprising the stop structure (100) of the electronic expansion valve (1000) of any preceding claim.

9. A refrigeration device comprising the electronic expansion valve (1000) of claim 8.

Patentansprüche

1. Anschlagkonstruktion (100) für ein elektronisches Expansionsventil (1000), wobei die Anschlagkonstruktion (100) Folgendes aufweist:

eine Mutter (10), die einen Rohrkörper (11), der ein erstes Ende und ein zweites Ende aufweist, wobei eine äußere Umfangswand des ersten Endes des Rohrkörpers (11) mit einem begrenzenden Schnappvorsprung (111) vorsteht; und einen Verbindungssitz (12), der mit dem ersten Ende des Rohrkörpers (11) verbunden ist, aufweist, wobei ein erster Vermeidungszwischenraum (a1) zwischen dem begrenzenden Schnappvorsprung (111) und dem Verbindungssitz (12) zum Installieren eines ersten Anschlags (22) der Federführungsschiene (20) bereitgestellt ist; und
eine Federführungsschiene (20),
wobei die Federführungsschiene (20) einen Führungsteil (21), der dem Rohrkörper (11) übergezogen ist, und einen ersten Anschlag (22), der an einem Ende des Führungsteils (21) bereitgestellt ist, aufweist, wobei der erste Anschlag (22) ein erstes axiales Segment (221), das mit dem Führungsteil (21) verbunden ist, und ein erstes Umfangssegment (222), das mit einem hinteren Ende des ersten axialen Segments (221) verbunden ist, aufweist, wobei das erste axiale Segment (221) sich entlang einer Längenrichtung der Mutter (10) erstreckt, wobei das erste Umfangssegment (222) sich entlang der Umfangsrichtung der Mutter (10) erstreckt, wobei das erste axiale Segment (221) auf einer Seite des begrenzenden Schnappvorsprungs (111) liegt und wobei das erste Umfangssegment (222) in dem ersten Vermeidungszwischenraum (a1) liegt und an einer von einem zweiten Ende des Rohrkörpers (11) weg befindlichen Seitenfläche des begrenzenden Schnappvorsprungs (111) anliegt, wobei der erste Anschlag (22) ferner ein zweites axiales Segment (223) aufweist, das mit einem hinteren Ende des ersten Umfangssegments (222) verbunden ist, und wobei das zweite axiale Segment (223)

sich zu dem zweiten Ende des Rohrkörpers (11) hin erstreckt und an einer anderen Seite des begrenzenden Schnappvorsprungs (111) liegt,

dadurch gekennzeichnet, dass der erste Anschlag (22) ferner ein zweites Umfangssegment (224) aufweist, das mit einem hinteren Ende des zweiten axialen Segments (223) verbunden ist, das zweite Umfangssegment (224) sich dabei entlang der Umfangsrichtung der Mutter (10) erstreckt, wobei das zweite Umfangssegment (224) auf einer zu dem zweiten Ende des Rohrkörpers (11) hin befindlichen Seite des begrenzenden Schnappvorsprungs (111) liegt und wobei das hintere Ende des zweiten Umfangssegments (224) mit dem ersten axialen Segment (221) und/oder dem Führungsteil (21) verbunden ist.

2. Anschlagkonstruktion (100) nach Anspruch 1, wobei die Mutter (10) ferner Folgendes aufweist: ein mit dem Rohrkörper (11) verbundenes Ende des Verbindungssitzes (12), das mit einem Verlängerungsteil (13) versehen ist, der sich zu dem Rohrkörper (11) hin erstreckt, wobei der Verlängerungsteil (13) gegenüber dem begrenzenden Schnappvorsprung (111) versetzt ist, wobei ein zweiter Vermeidungszwischenraum (a2) und ein dritter Vermeidungszwischenraum (a3) jeweilig auf zwei Seiten einer Umfangsrichtung des begrenzenden Schnappvorsprungs (111) verteilt sind und wobei der erste Vermeidungszwischenraum (a1) mit dem zweiten Vermeidungszwischenraum (a2) und dem dritten Vermeidungszwischenraum (a3) integriert ist, um eine U-förmige begrenzende Nut zur Begrenzung des ersten Anschlags (22) zu bilden.

3. Anschlagkonstruktion (100) nach Anspruch 2, wobei die Mutter (10) ferner den aus dem Verlängerungsteil (13) in einer Richtung auf das zweite Ende des Rohrkörpers (11) vorstehenden begrenzenden Schnappvorsprung (111) aufweist.

4. Anschlagkonstruktion (100) nach Anspruch 1, wobei die Mutter (10) ferner die äußere Umfangswand des ersten Endes des Rohrkörpers (11) aufweist, die ferner mit einem blockierenden Vorsprung (112) versehen ist, und wobei der blockierende Vorsprung (112) und der begrenzende Schnappvorsprung (111) in einer Umfangsrichtung der Mutter (10) voneinander beabstandet sind, um den ersten Anschlag (22) in der Umfangsrichtung zu begrenzen.

5. Anschlagkonstruktion (100) nach einem der Ansprüche 1 bis 4, wobei die Mutter (10) ferner wenigstens einen Teil einer Umfangsfläche des begrenzenden Schnappvorsprungs (111), der in einer Richtung von dem zweiten Ende des Rohrkörpers (11) weg und in einer Richtung von einer Mittellinie des Rohrkörpers (11) weg geneigt ist, aufweist.

6. Anschlagkonstruktion (100) nach einem der Ansprüche 1 bis 4, wobei die Mutter (10) ferner Folgendes aufweist:

eine begrenzende Nut, die an einer von dem zweiten Ende des Rohrkörpers (11) weg befindlichen Seitenfläche des begrenzenden Schnappvorsprungs (111) bereitgestellt ist; oder

ein von dem Rohrkörper (11) weg befindliches Ende des begrenzenden Schnappvorsprungs (111), das mit einem begrenzenden Vorsprung versehen ist, der in einer Richtung von einem zweiten Ende des Rohrkörpers (11) weg vorsteht, um einen Schlitz zwischen dem begrenzenden Vorsprung und der äußeren Umfangswand des Rohrkörpers (11) zu bilden; oder

eine vom zweiten Ende des Rohrkörpers (11) weg befindliche Seitenfläche des begrenzenden Schnappvorsprungs (111), die in einer Umfangsrichtung der Mutter (10) geneigt ist.

7. Anschlagkonstruktion (100) nach einem der vorhergehenden Ansprüche, wobei eine zum zweiten Ende des Rohrkörpers (11) hin befindliche Seitenfläche des begrenzenden Schnappvorsprungs (111) an einem Anfangsende des ersten axialen Segments (221) entlang der Längsrichtung der Mutter (10) in Anlage ist.

8. Elektronisches Expansionsventil (1000), das die Anschlagkonstruktion (100) des elektronischen Expansionsventils (1000) nach einem der vorhergehenden Ansprüche aufweist.

9. Kühlvorrichtung, die das elektronische Expansionsventil (1000) nach Anspruch 8 aufweist.

Revendications

1. Structure d’arrêt (100) pour un détendeur électronique (1000), dans laquelle la structure d’arrêt (100) comporte :

un écrou (10) comportant un corps de tuyau (11) comportant une première extrémité et une deuxième extrémité, une paroi périphérique extérieure de la première extrémité du corps de tuyau (11) faisant saillie avec une partie saillante d'encliquetage de limitation (111) ; et un siège de raccordement (12) raccordé à la première extrémité du corps de tuyau (11), un premier intervalle d'évitement (a1) étant mis en oeuvre entre la partie saillante d'encliquetage de limitation (111) et le siège de raccordement (12) pour installer une première butée (22) du rail de guidage à ressort (20) ; et

un rail de guidage à ressort (20),

dans laquelle le rail de guidage à ressort (20) comporte une partie de guidage (21) emmanchée sur le corps de tuyau (11), et une première butée (22) mise en oeuvre à une extrémité de la partie de guidage (21), dans laquelle la première butée (22) comporte un premier segment axial (221) raccordé à la partie de guidage (21), et un premier segment circonférentiel (222) raccordé à une extrémité arrière du premier segment axial (221), dans laquelle le premier segment axial (221) s'étend le long d'une direction allant dans le sens de la longueur de l'écrou (10), dans laquelle le premier segment circonférentiel (222) s'étend le long de la direction circonférentielle de l'écrou (10), dans laquelle le premier segment axial (221) est situé sur un côté de la partie saillante d'encliquetage de limitation (111), et dans laquelle le premier segment circonférentiel (222) est situé dans le premier intervalle d'évitement (a1) et vient buter sur une surface latérale de la partie saillante d'encliquetage de limitation (111) à distance d'une deuxième extrémité du corps de tuyau (11), dans laquelle la première butée (22) comporte par ailleurs un deuxième segment axial (223) raccordé à une extrémité arrière du premier segment circonférentiel (222), et dans laquelle le deuxième segment axial (223) s'étend vers la deuxième extrémité du corps de tuyau (11) et est situé sur un autre côté de la partie saillante d'encliquetage de limitation (111),

caractérisée en ce que la première butée (22) comporte par ailleurs un deuxième segment circonférentiel (224) raccordé à une extrémité arrière du deuxième segment axial (223), le deuxième segment circonférentiel (224) s'étendant le long de la direction circonférentielle de l'écrou (10), dans laquelle le deuxième segment circonférentiel (224) est situé sur un côté de la partie saillante d'encliquetage de limitation (111) vers la deuxième extrémité du corps de tuyau (11), et dans laquelle une extrémité arrière du deuxième segment circonférentiel (224) est reliée au premier segment axial (221) et/ou à la partie de guidage (21).

2. Structure d'arrêt (100) selon la revendication 1, dans laquelle l'écrou (10) comporte par ailleurs : une extrémité du siège de raccordement (12) raccordée au corps de tuyau (11) comportant une partie d'extension (13) s'étendant vers le corps de tuyau (11), dans laquelle la partie d'extension (13) est décalée par rapport à la partie saillante d'encliquetage de limitation (111), dans laquelle un deuxième intervalle d'évitement (a2) et un troisième intervalle d'évitement (a3) sont respectivement répartis sur deux côtés d'une direction circonférentielle de la partie saillante d'encliquetage de limitation (111), et dans laquelle le premier intervalle d'évitement (a1) est intégré au deuxième intervalle d'évitement (a2) et au troisième intervalle d'évitement (a3) pour former une rainure de limitation en forme de U de manière à limiter la première butée (22).

3. Structure d'arrêt (100) selon la revendication 2, dans laquelle l'écrou (10) comporte par ailleurs la partie saillante d'encliquetage de limitation (111) faisant saillie hors de la partie d'extension (13) dans une direction allant vers la deuxième extrémité du corps de tuyau (11).

4. Structure d'arrêt (100) selon la revendication 1, dans laquelle l'écrou (10) comporte par ailleurs la paroi périphérique extérieure de la première extrémité du corps de tuyau (11) comportant par ailleurs une partie saillante de blocage (112), et dans laquelle la partie saillante de blocage (112) et la partie saillante d'encliquetage de limitation (111) sont espacées dans une direction circonférentielle de l'écrou (10), de manière à limiter la première butée (22) dans la direction circonférentielle.

5. Structure d'arrêt (100) selon l'une quelconque des revendications 1 à 4, dans laquelle l'écrou (10) comporte par ailleurs au moins une partie d'une surface périphérique de la partie saillante d'encliquetage de limitation (111) qui est inclinée dans une direction allant à l'opposé de la deuxième extrémité du corps de tuyau (11) et dans une direction allant à l'opposé d'une ligne centrale du corps de tuyau (11).

6. Structure de butée (100) selon l'une quelconque des revendications 1 à 4, dans laquelle l'écrou (10) comporte par ailleurs :

une rainure de limitation qui est mise en oeuvre sur une face latérale de la partie saillante d'encliquetage de limitation (111) à l'opposé de la deuxième extrémité du corps de tuyau (11) ; ou

une extrémité de la partie saillante d'encliquetage de limitation (111) à l'opposé du corps de tuyau (11) comportant une partie saillante de limitation faisant saillie dans une direction allant à l'opposé d'une deuxième extrémité du corps de tuyau (11), pour former une fente entre la partie saillante de limitation et la paroi périphérique extérieure du corps de tuyau (11) ; ou une surface latérale de la partie saillante d'encliquetage de limitation (111) à l'opposé de la deuxième extrémité du corps de tuyau (11) qui est inclinée dans une direction circonférentielle de l'écrou (10).

7. Structure d'arrêt (100) selon l'une quelconque des revendications précédentes, dans laquelle une surface latérale de la partie saillante d'encliquetage de limitation (111) vers la deuxième extrémité du corps de tuyau (11) vient buter contre une extrémité de début du premier segment axial (221) le long de la direction allant dans le sens de la longueur de l'écrou (10).

8. Détendeur électronique (1000) comportant la structure d'arrêt (100) du détendeur électronique (1000) selon l'une quelconque des revendications précédentes.

9. Dispositif de réfrigération comportant le détendeur électronique (1000) selon la revendication 8.

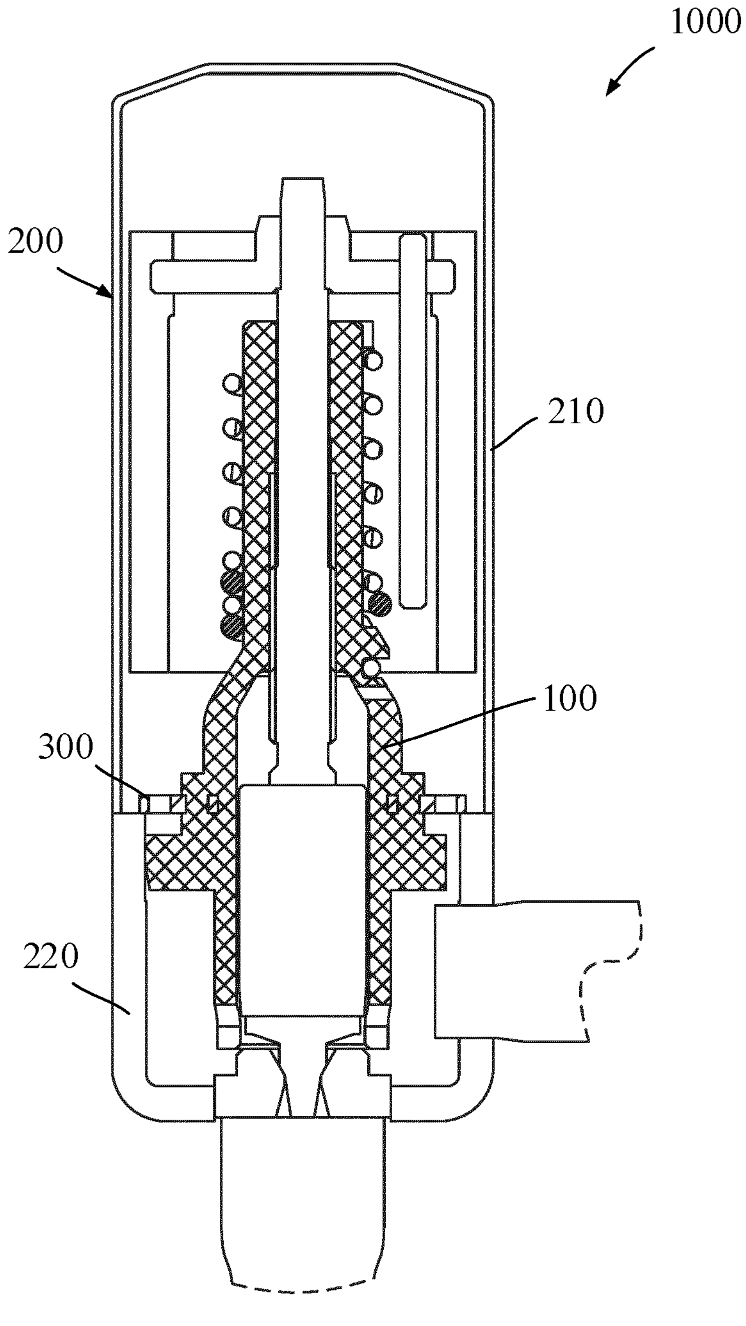

FIG. 1

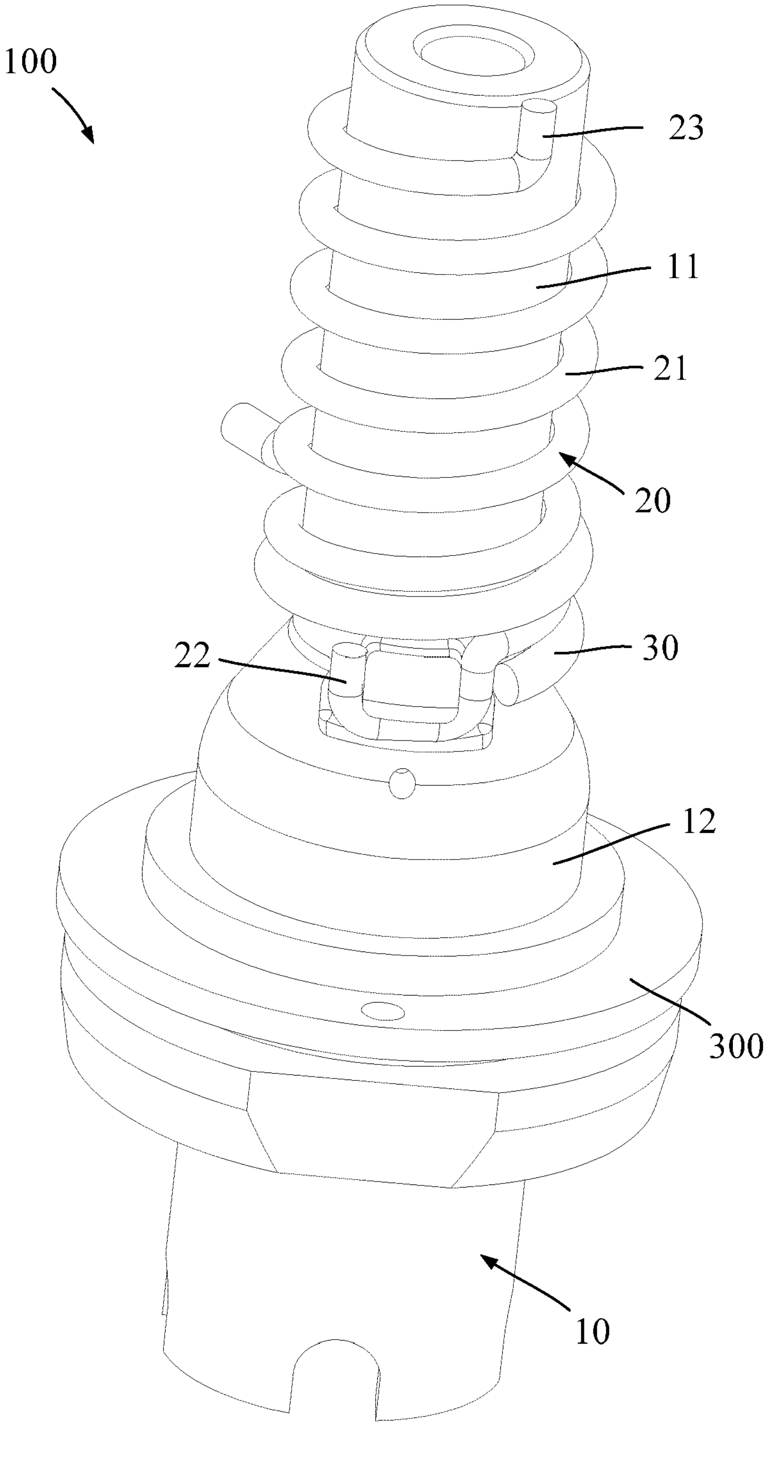

FIG. 2

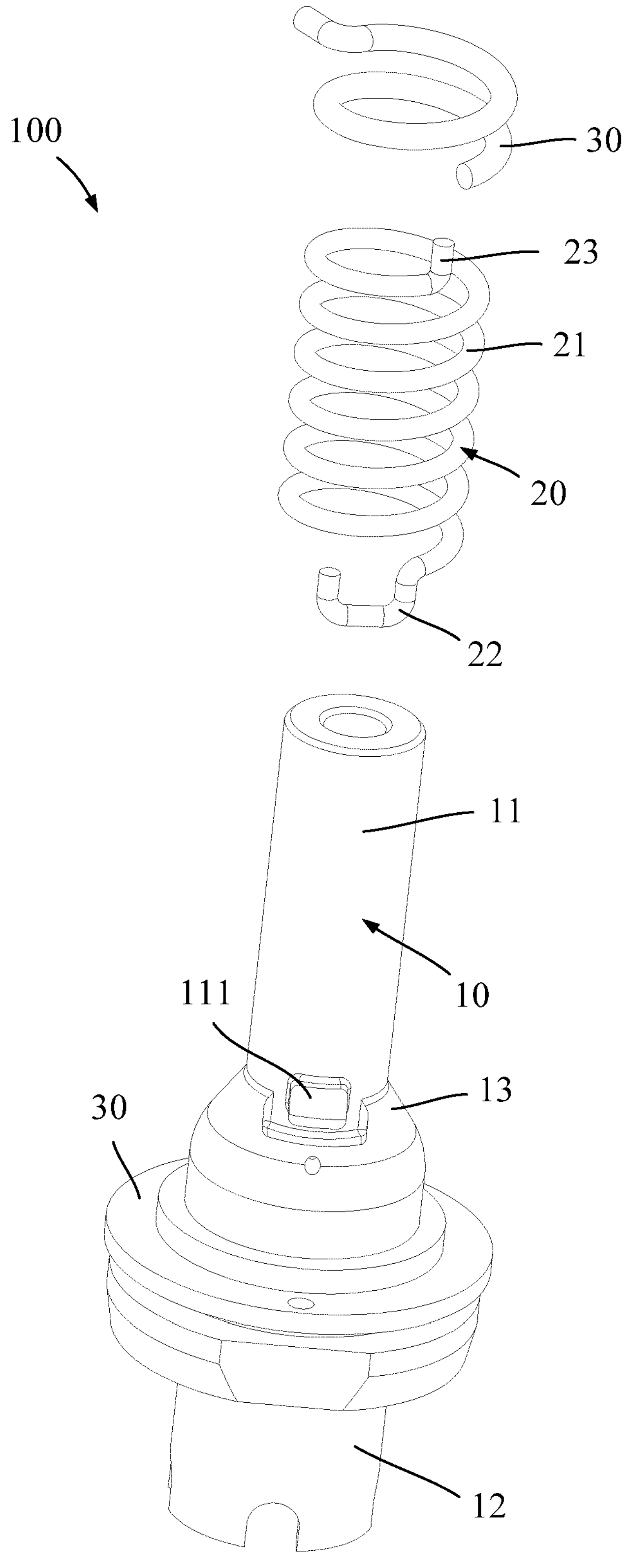

FIG. 3

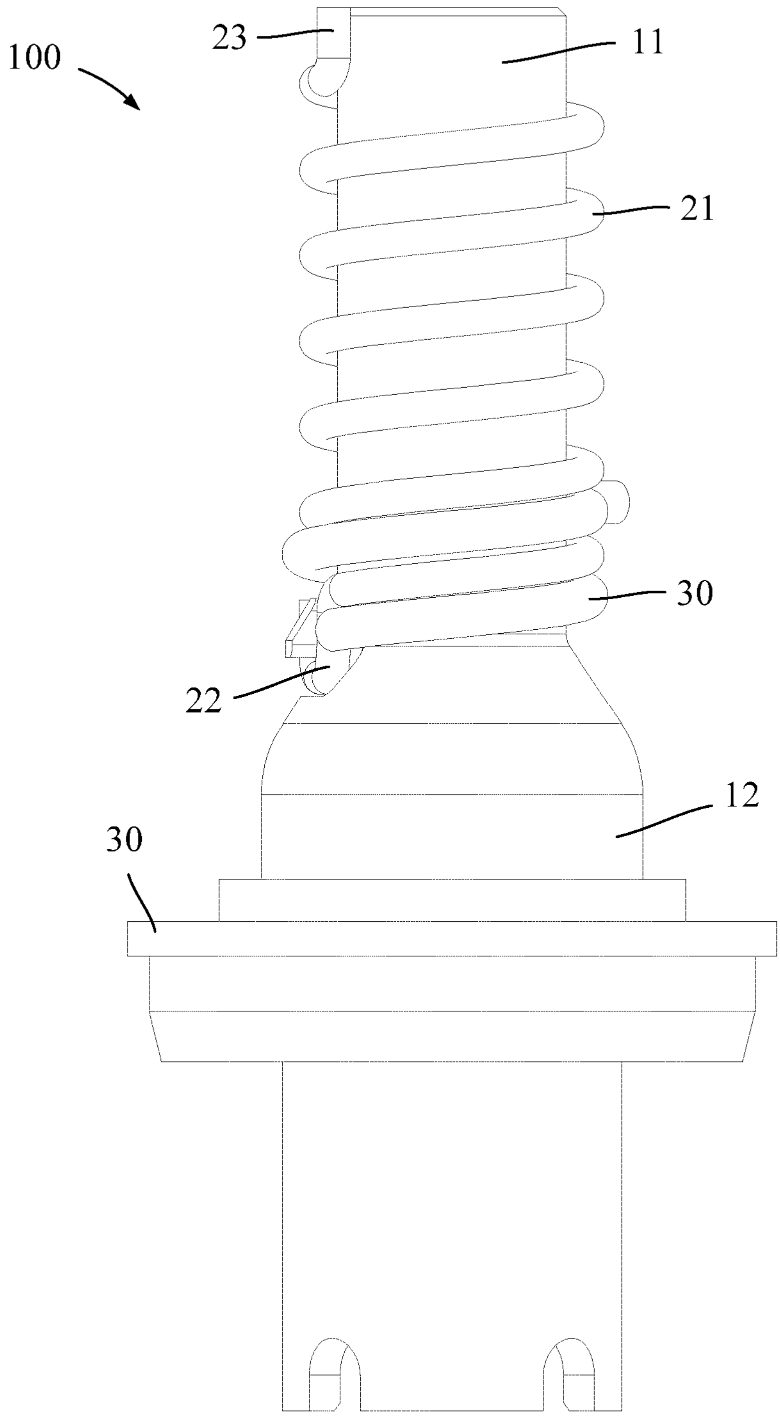

FIG. 4

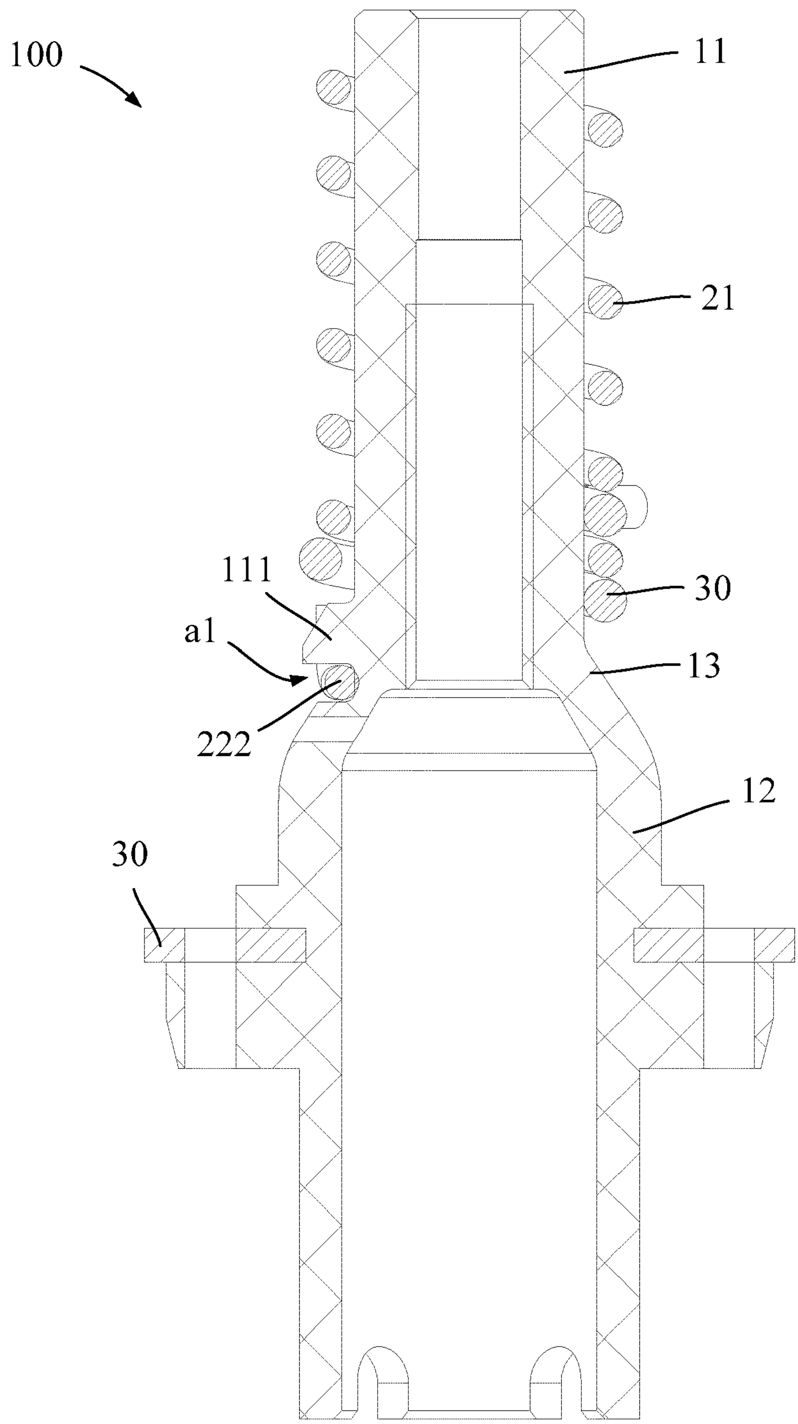

FIG. 5

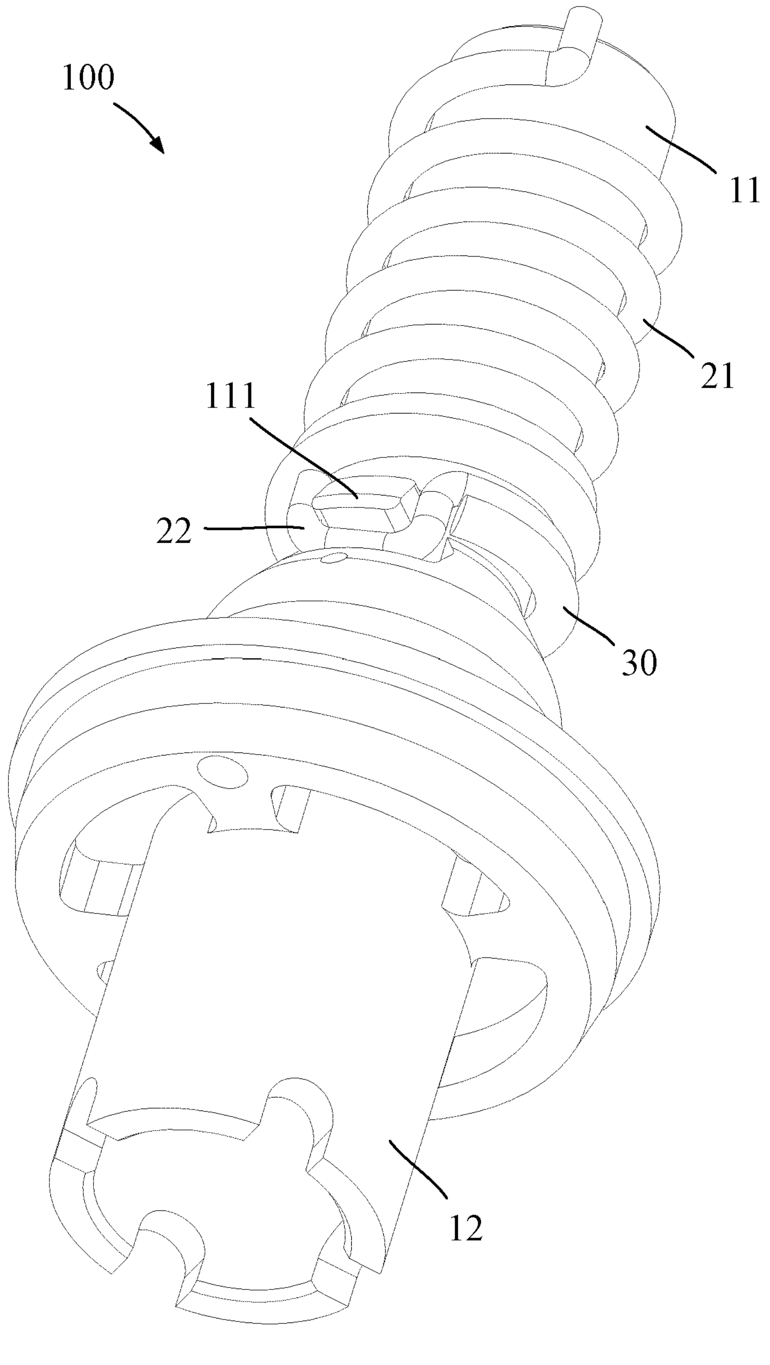

FIG. 6

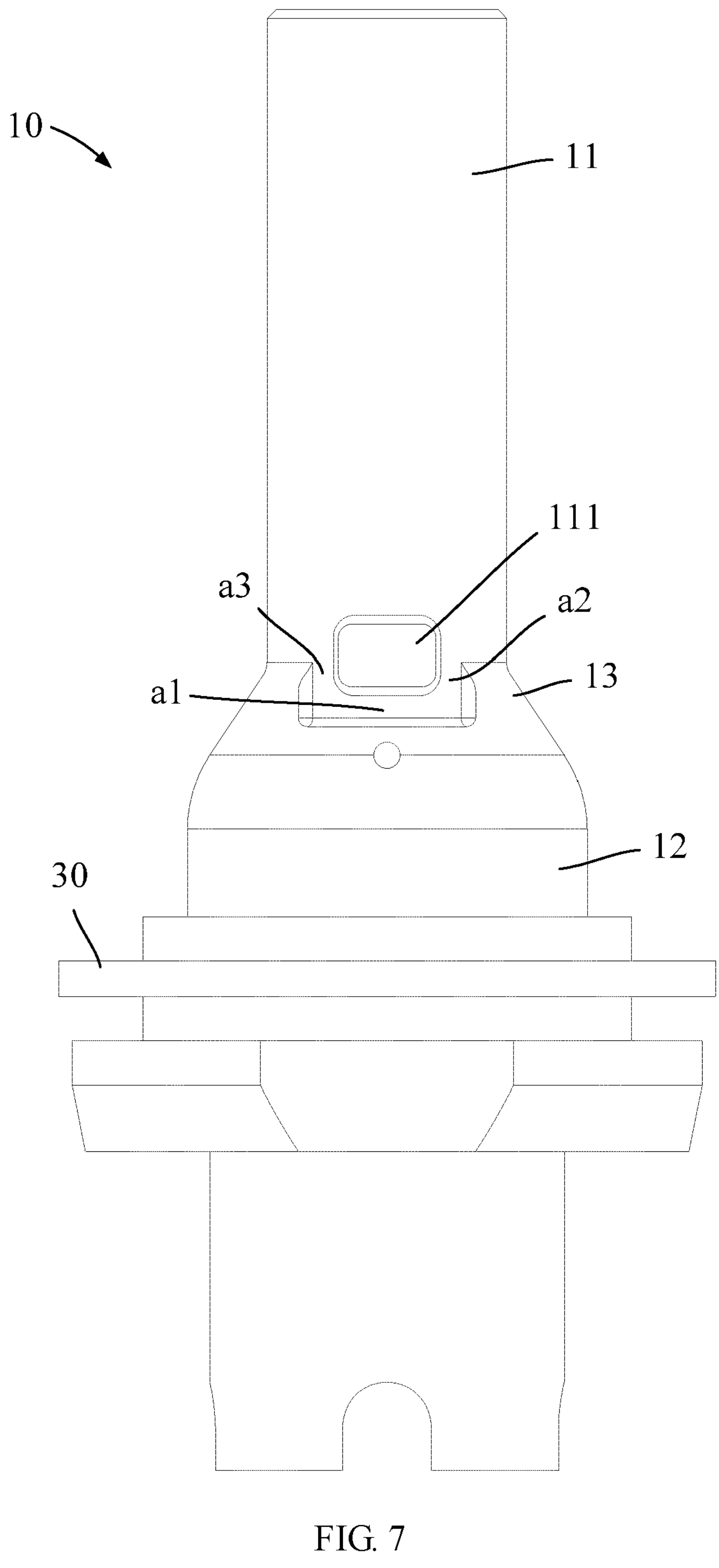

FIG. 7

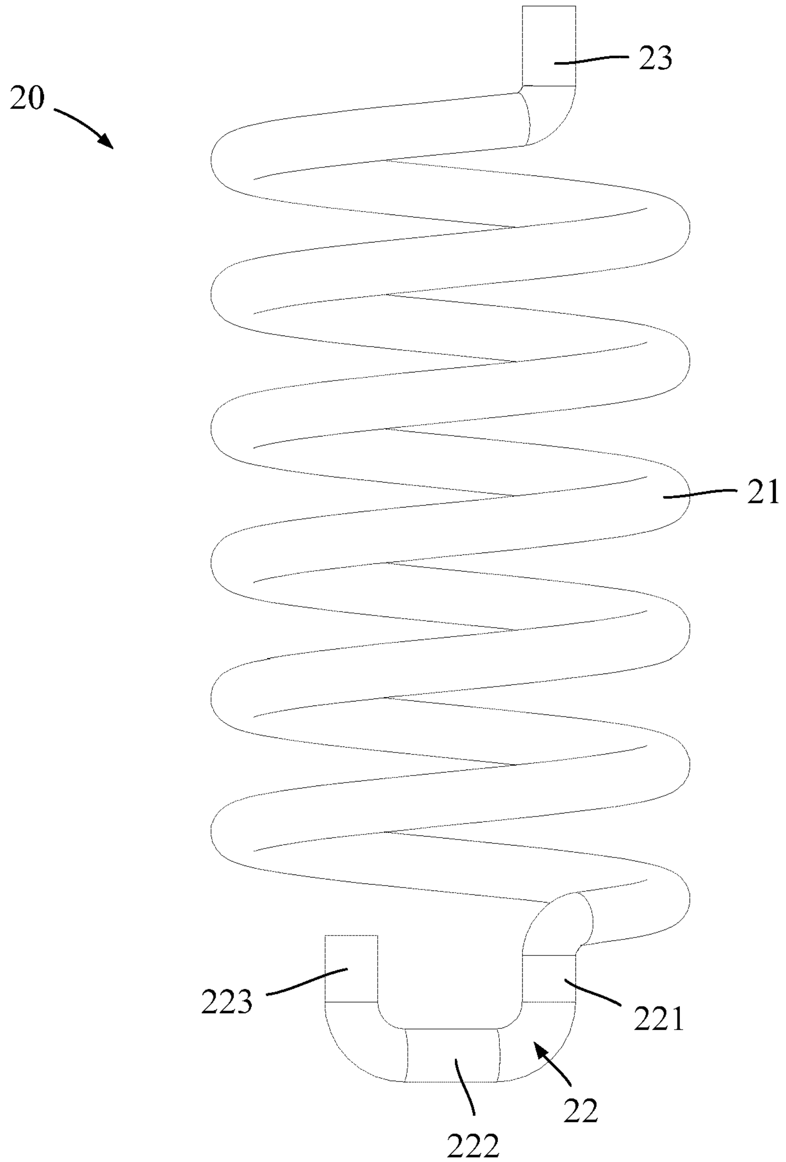

FIG. 8

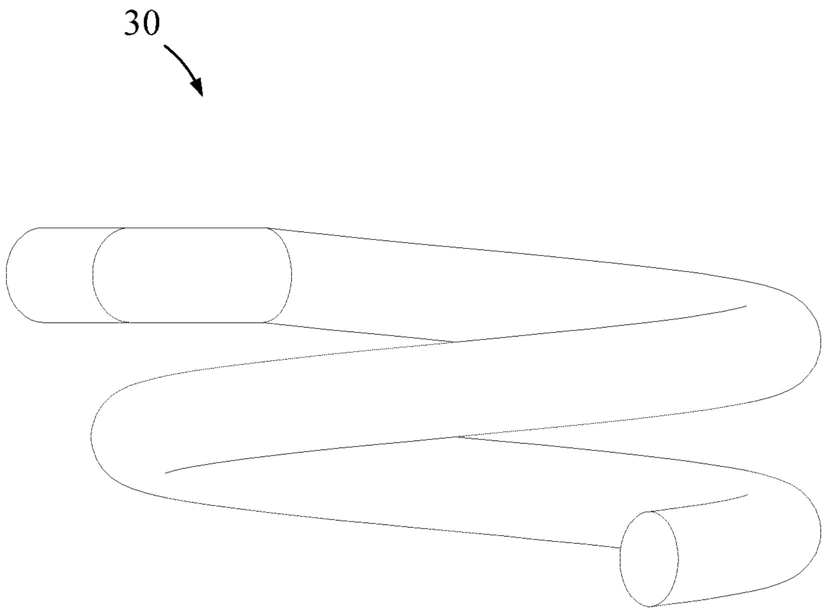

FIG. 9

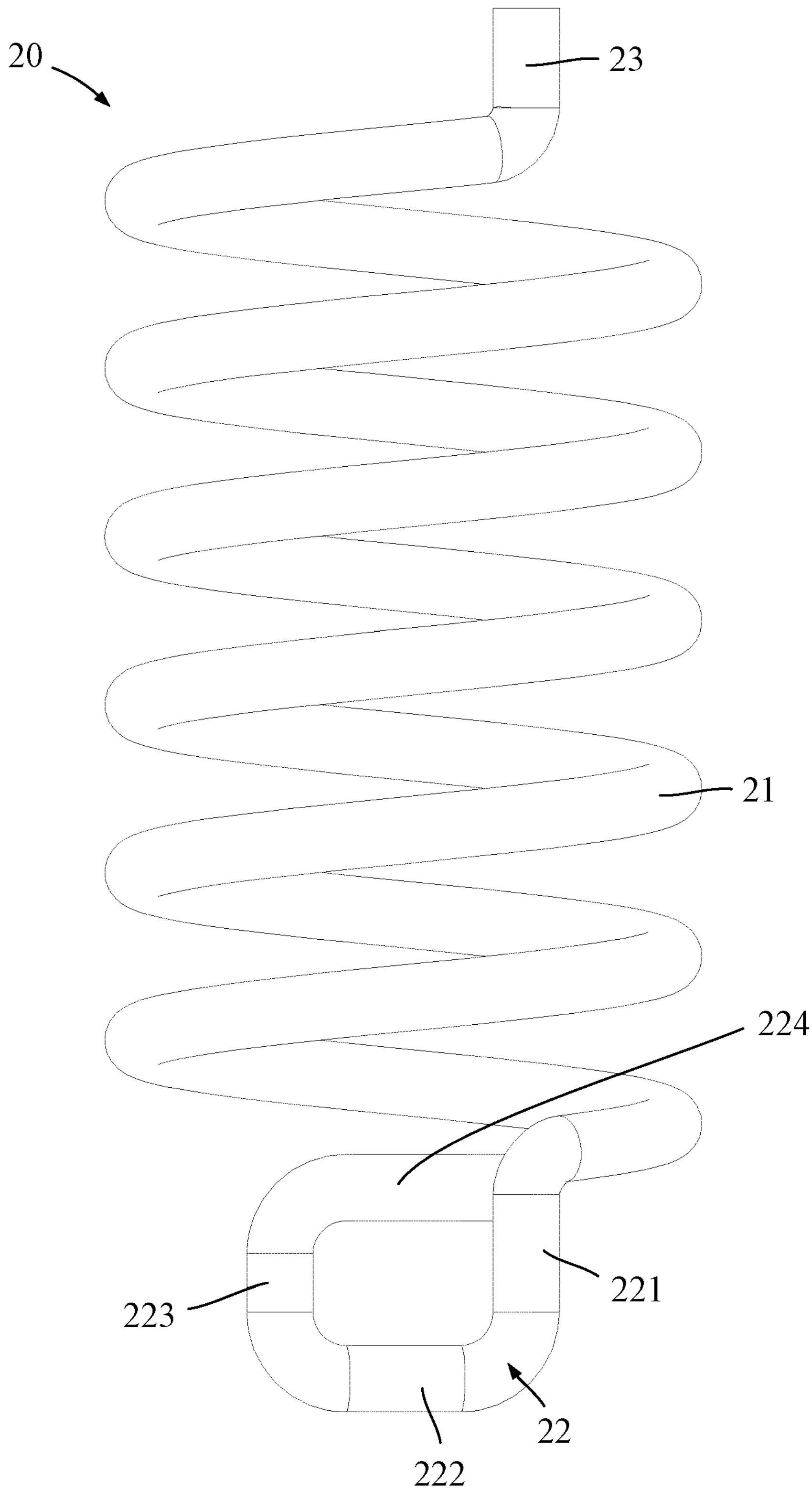

FIG. 10

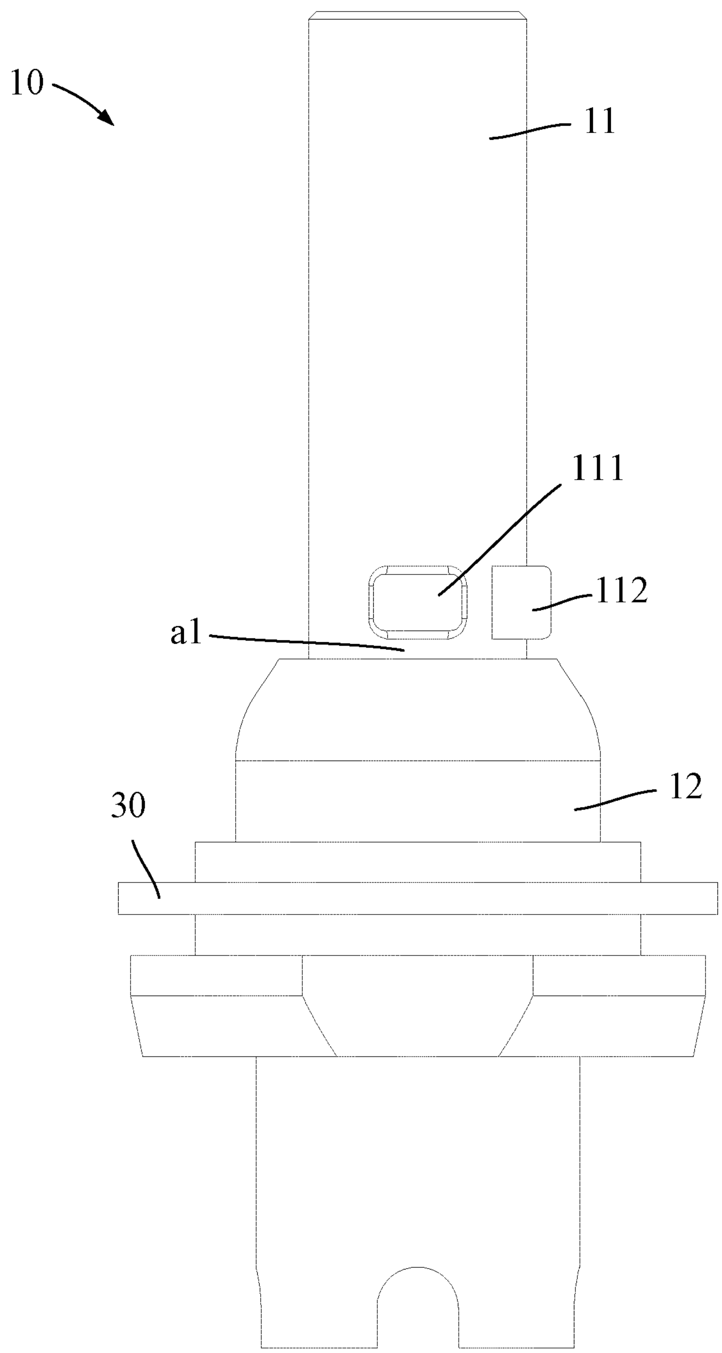

FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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